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Active Ingredients of Instructional Coaching: Developing a Conceptual Framework

Andrew S. White, Michelle Howell Smith, Gina M. Kunz, & Gwen C. Nugent

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Authors' Note

Andrew S. White, Department of Educational Psychology, University of Nebraska–Lincoln

Michelle Howell Smith, Nebraska Academy for Methodology, Analytics and Psychometrics, University of Nebraska–Lincoln

Gina M. Kunz, Nebraska Center for Research on Children, Youth, Families and Schools, University of Nebraska–Lincoln

Gwen C. Nugent, Nebraska Center for Research on Children, Youth, Families and Schools, University of Nebraska–Lincoln

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Correspondence concerning this article should be addressed to Gwen Nugent, Nebraska Center for Research on Children, Youth, Families and Schools, 216 Mabel Lee Hall, University of Nebraska–Lincoln, Lincoln, NE 68588-0235. Contact: gnugent1@unl.edu

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Abstract

Although researchers have explored the impact of instructional coaching and named possible elements believed essential to effective coaching, there has yet to emerge from the literature a coherent model of those essential elements (“active ingredients”). This qualitative study sought to identify those elements through a systematic process beginning with a synthesis of current coaching literature to compile a list of ingredients. Using a modified grounded theory approach, this list was then validated through semi-structured focus group data of teachers and triangulated with focus group data provided by instructional coaches to create a conceptual framework of coaching. Future coaching research can build upon this framework through empirically testing those key components that are necessary for effective coaching.

Keywords: *Instructional Coaching, Coaching Framework, Coaching Model, Modified Grounded Theory Approach, Active Ingredients*

Active Ingredients of Instructional Coaching: Developing a Conceptual Framework

Effective teacher development is critical in order to keep pace with the constantly changing nature of education. Recent teacher accountability efforts such as No Child Left Behind (NCLB) have altered curriculum and instruction practices, while initiatives such as the Common Core have influenced the content of what is taught in K–12 classrooms. Implementing new curricula to meet these evolving standards often involves teacher training in the form of professional development seminars or workshops. Studies have shown that traditional “sit and get” forms of teacher professional development are rarely effective in providing teachers with the adequate knowledge, skills, and abilities needed to be successful in implementing new curriculum (Sparks, 2002). Typical professional development (PD) for teachers in the United States has been described as “short, episodic and disconnected from practice” (Wei, Darling-Hammond, & Adamson, 2010, p. 1) and “a hodgepodge of providers, formats, philosophies, and content” (Hill, 2007, p. 114). A comprehensive review of the teacher PD literature sponsored by the National Staff Development Council (Darling-Hammond et al., 2009; Wei et al., 2010) identified several key characteristics that influence positive outcomes, including the need for follow-up support beyond the initial PD experience.

The Reading First Initiative, a key piece of NCLB legislation, suggested coaching “as a viable way to provide sustained and effective professional development support to teachers” (Denton & Hasbrouck, 2009, p. 154). The requirement that each Reading First school be served by a reading coach created thousands of reading coaching positions (Denton & Hasbrouck, 2009). Coaching models rapidly extended into mathematics and today there are a few examples of science coaching. Instructional coaching is a process through which a coach “works collaboratively with a teacher to improve that teacher’s practice and content knowledge, with the ultimate goal of affecting student achievement for the purpose of learning new skills or improving current skills” (Sutton et al., 2011). Instructional coaching is embedded and situated work that includes observations of classroom teaching, demonstrations of model practices and cycles that include pre- and post-conferences with practitioners (Neufeld & Roper, 2002). Coaching requires skills in communication, relationship building, change management, and leadership for professional development (Knight, 2006; Kunz, White, Howell Smith, & Nugent, 2014).

While instructional coaching is widely accepted, little is known from an empirical standpoint about what makes coaching effective. The literature on coaching is predominantly descriptive, based on case study approaches that represent little standardization in coaching approach or duration (Borman & Feger, 2006; Cornett & Knight, 2009). Despite its limitations, however, research with literacy and mathematics coaching suggests promise (Campbell & Malkus, 2011; Foster & Noyce, 2004; Sailors & Shanklin, 2010). Coaching has led to impacts beyond teacher improvement to student achievement (Lockwood et al., 2010; Powell et al., 2010), although effects often are not realized until the second year—after teachers gain experience with new practices (Allen et al., 2011; Campbell & Malkus, 2011).

The purpose of our study was to develop a conceptual model of the active ingredients of instructional coaching grounded in qualitative data collected from participants in an empirically

tested effective coaching experience. *Active Ingredients* are those unique components of an intervention that constitute what is hypothesized as responsible for targeted teacher and student outcomes (Sheridan, Rispoli, & Holmes, 2014). Our qualitative study was embedded within a large scale experimental study of instructional coaching for science teachers in rural communities. An embedded study is appropriate when there are additional research questions nested within the context of a larger design that are meant to enhance the overall study (Creswell & Plano Clark, 2011). Because the primary experimental study constrained our ability to fully implement a grounded theory approach, we adapted grounded theory methods for the purpose of developing our conceptual model. It is also important to note that we developed this framework within a rural context, which provides unique challenges and opportunities for delivering instructional coaching. Although the developed model does not address context, the coaching process that was used to develop the model did.

Research Questions

Central Research Question: What are the active ingredients of instructional coaching?

Sub Question 1: How do teachers who received effective instructional coaching describe the active ingredients?

Sub Question 2: How do coaches who provided effective instructional coaching describe the active ingredients?

Our model of the active ingredients of instructional coaching will be of interest to a variety of audiences and relevant across a number of settings. Researchers who study instructional coaching and the agencies and foundations that fund them will benefit from having a more precise model for developing coaching protocols and assessing coaching delivery for empirical study. Instructional coaches will benefit from having more clearly defined roles for their work and a framework that can inform their own professional development. Perhaps the most important audience for this work is teachers who participate in instructional coaching. This model will provide a context for setting expectations about the coaching experience that will maximize their professional growth and development. Another audience to benefit from the study of this coaching model is students themselves. Previous research has found mixed success regarding student outcomes, with some studies reporting immediate positive effects (e.g., Marsh, McCombs, & Martorell, 2010), others finding positive outcomes only after the second year of instructional changes (e.g., Allen et al., 2011), and others not finding statistically significant differences in student outcomes after the first nor second year of coaching (e.g., Garet et al., 2008). The establishment of a model that identifies those essential components of coaching may help future researchers observe positive student outcomes earlier through addressing existing variability in coaching service delivery.

Study Background

This qualitative study was embedded within *Coaching Science Inquiry in Rural Schools (CSI)*, an experimental study to investigate effects of instructional coaching in science for rural secondary science teachers. The rural context for this study provided a unique opportunity to

examine the impact of instructional coaching in science inquiry among a population of teachers whose access to instructional coaching is typically limited when compared to their counterparts in more populated locations. The smaller population base in rural communities impacts the availability of resources for providing teacher professional development; smaller student populations may not warrant full-time, on-site instructional support for teachers; and geographic isolation increases the cost of itinerant in-person support (Reeves, 2003). Indeed, small and rural districts have been found to allocate considerably fewer resources to professional development than heavier-populated districts (Killeen, Monk, & Plecki, 2002). In addition to limited access to instructional coaching support, teachers in rural communities also have limited time to take advantage of instructional coaching, given the variety of roles they typically serve within their districts.

The *CSI* program consisted of an in-person, two-week summer institute and six to eight weeks of technology-delivered instructional coaching sessions. The summer institute not only provided instruction to the rural science teachers regarding evidence-based practices in inquiry instruction, but it also served an important role in establishing positive relationships between the teachers and their respective project-based science coaches. Following the institute, teachers identified a six- to eight-week period during the academic year in which they then received coaching support in implementing scientific inquiry lessons in chemistry, earth, physical, and life sciences for middle or high school students (grades 6–12). After jointly setting instructional goals with their coaches, teachers video recorded themselves implementing a lesson. The video was reviewed independently by both the teacher and the coach prior to the coaching session, which was held using WebEx, an online meeting software. The online meeting allowed the teacher and the coach to review the lesson together and to set goals for the next lesson. Preliminary research employing direct observation of classroom practice and teacher-completed assessments and questionnaires showed that teachers who participated in the intervention had significant gains in inquiry teaching practice and knowledge compared to a “business as usual” control condition (i.e., teaching the same as usual and participating in neither the *CSI* summer institute nor coaching) (Nugent, Kunz, & Houston, 2015).

The four *CSI* coaches combined for more than 100 years of classroom experience in the elementary, middle, and high school levels; all had extensive experience as science teachers. The coaches also brought a myriad of other skills and experience that included curriculum development at the classroom, department, building, and district levels; extensive practice in integrating technology into the classroom settings, identifying innovative online applications to engage students, and using web based productivity suites such as Google Apps for Education; creating and evaluating state and local level student assessment tools; and serving as professional mentors for new teachers.

Methods

Our qualitative study, embedded within the *CSI* project, employed two approaches in developing a model of the active ingredients of instructional coaching. The first approach was a literature review of relevant studies and descriptive pieces on instructional coaching. The second was an adapted grounded theory approach based on focus group data from both teachers and instructional coaches who participated in the *CSI* study.

Literature Review Approach

In order to develop a preliminary list of active ingredients, we conducted a review of existing literature. In addition to an initial pool of articles identified for the larger experimental study, we searched for articles using the terms “coaching,” “instruction,” and “teachers” through EBSCO Academic Search Premier. We identified 53 articles that examined the coaching of teachers and provided or implied those components that led to success. In all, 182 components attributed by authors as important to successful coaching were identified, although many of these overlapped or were closely related. These potential active ingredients were organized into three broad categories: coach factors, teacher factors, and coach-teacher interaction factors. This preliminary list was integrated with the initial model developed from qualitative data described next.

Adapted Grounded Theory Approach

The qualitative study was embedded in the *CSI* project. Given the logistical constraints of the *CSI* project, we chose to adapt grounded theory methodologies to develop an empirical model of effective instructional coaching. Grounded theory uses a “systematic, inductive, and comparative” process (Bryant & Charmaz, 2007, p. 1) to produce strong substantive or formal theories where none existed previously (Glaser, 2007; Glaser & Strauss, 1967; Kearney, 2007). Models developed through grounded theory methodologies are more robust than those derived from other qualitative methodologies in explaining events, predicting outcomes, and guiding effective practices (Strauss & Corbin, 1998).

Data collection and analysis procedures were modified from a traditional grounded theory approach of jointly collecting, coding, and analyzing data to ensure saturation of relevant categories (Glaser & Strauss, 1967). Our data collection and analysis occurred in two distinct waves. The first wave consisted of collecting and analyzing data from 16 rural science teachers who had completed their coaching experience in the first year of the *CSI* study. These teachers participated in one of three one-hour, semi-structured focus groups in which they shared their experiences, provided feedback to the research team, and made recommendations for improving the coaching process. Audio recordings of the focus groups were transcribed verbatim, yielding 94 pages of data. Transcripts were imported into MAXQDA 11, a qualitative data analysis software package that provides a vehicle for organizing data and efficiently retrieving particular data segments for comparison or additional analysis based on the researchers’ coding. Teacher data were analyzed using a constant comparative or zigzag process (Creswell, 2007) consisting of multiple iterations of coding and selective analyses in order to fully synthesize and organize the data (Charmaz, 2006). The findings from the literature review were integrated into the framework that had emerged from the teacher data using a similar analytic approach to create a preliminary model of effective instructional coaching practices. The second wave of data were collected from three of the *CSI* coaches at the conclusion of their two years coaching rural science teachers. The coaches participated in a day-long focus group exploring the preliminary model of effective instructional coaching practices from their perspectives. As before, the focus groups were audio-recorded, transcribed verbatim yielding 69 pages of data, and imported into MAXQDA. Data from the coaches were coded and analyzed in reference to the preliminary model in an iterative fashion. Through the second wave of analysis, only minimal adjustments

were made to the model, often in the form of broadening the definition of a particular code to account for the unique perspectives provided by the coaches.

Findings

Our model (see Figure 1) addresses the prerequisite coach and teacher characteristics, relational contexts, and coaching processes necessary for positive coaching outcomes. First, we provide a brief overview of the model and follow with detailed descriptions and examples from the data.

A necessary prerequisite characteristic of effective coaches is not only a command of the content area they are coaching, but also classroom experience. They also need to be proficient enough with relevant technology to assist teachers (both in troubleshooting utilized technology and demonstrating competence in finding additional resources to help teachers) and have a flexible schedule in order to meet based on the teachers' availability. Coaches also need to view their role in partnership with the teachers and have strong interpersonal skills in order to develop positive relationships. Teacher prerequisites include the need to have a basic knowledge of their content area, willingness to engage in the coaching process, and a genuine concern for improving student learning.

Instructional coaching is a relational process and, as such, effective coaching occurs when there is a strengths-based shared approach to a coaching partnership. The requisite relational aspects of the coaching process include an emphasis on positive feedback throughout. In addition, the coach and teacher should express mutual respect, reciprocal trust, and positive rapport.

Effective instructional coaching requires a goal-directed process that involves the coach and teacher jointly planning the goals for each coaching period. Teachers then have an opportunity to practice the target skills in the classroom. Both the coach and the teacher observe that practice independently through video review and reflect on the implementation of new skills. The teacher shares his or her reflections with the coach, and the coach provides feedback based on the observations. Together, the teacher and coach engage in a reflective discussion to consolidate their experiences. The process then circles back to the joint planning phase to prepare for the next coaching session. Progression through the process influences multiple outcomes, which are in turn used to inform decisions made within the coaching process. When the coach and teacher feel that their goals have been met and the new skills have been "internalized," the coaching process ends.

As a result of engaging in this goal-directed, strengths-based, shared approach to a coaching partnership, teachers increase their knowledge in the coached subject area and improve their classroom practices, which in turn lead to more positive outcomes for student learning. Teachers believed that this model, when implemented with fidelity from both the coach and teacher, produced results that could be sustained beyond the scope of the coaching period.

Requisite Coach Characteristics

Coaches' credibility as instructional specialists is key to successful coaching (Rivera, Burley, & Sass, 2004); thus, they must take steps to establish *expertise in the content area* being coached (Borman & Feger, 2006). Coaches agreed that it was critical to have expertise in the subject area they were expected to coach but noted that they often had to conduct additional research in order to provide support on particular topics outside of their expertise. One coach noted that expertise across all subject areas was not necessary because in some areas "you're certainly not an expert but you know more than the kids do." The ability to identify resources and help teachers interpret and use them is a key coaching skill (Cantrell & Hughes, 2008; Driscoll, 2008), one that enhances coaches' roles as supporters (Obara, 2010). Teachers, on the other hand, were not especially concerned with their coaches' content knowledge. Rather, the teachers emphasized that the credibility of a coach in providing feedback was directly related to the coach's *classroom experience*. Coaches' previous teaching experience helped them "relate to what each person was dealing with." Their classroom experience was noted as being particularly helpful in understanding not only how to "instruct the kids" but also how to "work with adults that are learning." The value of classroom experience for instructional coaches is consistent with literature that suggests that, in addition to strong content knowledge, coaches should also possess strong pedagogical knowledge, knowledge of the curriculum, awareness of coaching resources, and knowledge of the practice of coaching (Feger, Woleck, & Hickman, 2004). Coaches believed that 5–8 years of teaching experience would be sufficient to have both the content knowledge and resources necessary to be an effective instructional coach.

Coaches are largely responsible for the embedding of technology in coaching (Rush & Young, 2011), and multiple sources indicated *proficiency with technology* as a positive coach characteristic (e.g., Allen et al., 2011; Rose, 2010). Technological expertise is especially important for coaches working in rural areas who may conduct all of their coaching online (Rush & Young, 2011). Teachers in rural schools may not have access to technical support personnel on-site, so their coach is often the only one available to help them learn how to use the technologies necessary for the coaching to take place. Navigating online meeting software (i.e., Webex) and cloud-based file sharing (i.e., Dropbox) was intimidating for many of the teachers in our study. For one teacher, in particular, the intimidation was palpable: "I had a horrendous fear of trying to be able to set all this up and hook everything up and plug in and present and everything." Initially our coaches felt the technology was "scary," noting that "if it can go wrong, it will go wrong." Eventually the coaches learned to "preemptively attack" different technological issues, and they became confident in troubleshooting technological issues that arose during coaching sessions. The distance coaching model was efficient in that it allowed coaches to focus on coaching their teachers instead of driving site to site. Coaches and teachers were "as face-to-face as you could be" using the video-based online meeting software, which the coaches felt was more effective than email or phone conversations, "even though we did have the hiccups that we did online."

From the teachers' point of view, the most essential coach characteristic was a *flexible schedule*. Teachers mentioned having coaching sessions at 6:00 am before they went to school or late in the evening after their children had gone to sleep. They realized that these sessions

were often held outside of “normal working hours,” and the teachers appreciated being able to fit their coaching sessions around their other commitments. For the teachers, this flexibility made them feel that their coach “cared about you as a person, too.” Coaches realized that teachers, especially rural teachers, have multiple responsibilities outside of the classroom (e.g., supervising multiple student organizations) which lead to limited windows of availability to meet. In scheduling coaching sessions, coaches had to “try to plan long term, but really be flexible in the short term.”

Coaches were keenly aware that their role was not only to help the teachers grow but also to learn from the experience themselves. This perspective, *viewing coaching as a partnership*, was critical for the coaching relationship to move forward. One coach commented that “a really dominant, ‘I think I have to tell you all that I know so that you know it’ kind of personality” would not be an effective approach as a coach. Instead, coaches reflected on their own performance so they could make changes for the future. Indeed, one of the reviewed articles emphasized the importance to establish a culture where everyone’s practice (including the coach) is up for critique (Rivera et al., 2004). The teachers also valued the partnership approach to coaching. They felt that they were on an “equal plane” with their coach as a result of the strong relationship they had built during the summer institute professional development workshop. The teachers realized their coaches were not there to criticize them or point out mistakes but to serve as partners in learning new skills. One teacher commented, “They were here to build me up and help me become better.”

The literature was clear that coaches must possess *strong interpersonal and communication skills* (Borman & Feger, 2006) as these skills are paramount to building effective relationships with teachers (e.g., Feger et al., 2004; Killion & Harrison, 2005). Content knowledge can be increased through education, but interpersonal skills are somewhat inherent and therefore not as easily impacted by training (Nugent, Kunz, & Houston, 2015; Ertmer et al., 2003). Strong interpersonal skills allow coaches to interact with a variety of personalities, especially “difficult” staff members who may resist coaching (Stock & Duncan, 2010). Coaches need to diagnose teachers’ needs, even when teachers may not be aware of what those needs are, and adjust their approach accordingly (e.g., Cantrell & Hughes, 2008; West & Staub, 2003; Sugar, 2005). The coaches described this as “wearing a different hat” as they adjusted their demeanor or coaching style to best suit the needs and personalities of individual teachers. One coach in particular summed up the importance of adapting interactions to individual teachers:

“And that’s kind of that same thing we always say about kids: you have to meet them where they are and not where you want them to be. Well, that’s the same with teachers that you’re mentoring or coaching.”

As a result of the coaches’ strong interpersonal skills, teachers got to know their coaches’ personalities and how they “ticked,” which helped them feel comfortable with their coach. One teacher described her coach’s approach by saying “he just made it so if I had any questions, I could just bounce them off him.” Having developed strong relationships from the summer institute going into the coaching experience “made it feel a lot more safe.” However, not all coaching paradigms include intensive opportunities to build relationships such as the summer

institute. As a result, the coaches' interpersonal and communication skills must be strong enough to facilitate relationship-building without the aid of extended face-to-face interactions.

Requisite Teacher Characteristics

Unlike coaches who need a mastery of the coached content area, it should not be necessary for teachers to possess content expertise beyond the *basic knowledge* requirements of their teaching certification (i.e., content and pedagogy). Coaches in our study were impressed with the quality of instruction their teachers were delivering, especially given the limited resources for professional development in rural areas and the multiple subject areas rural science teachers must teach. One case study suggested that deficits in teacher content knowledge limit the potential benefits from instructional coaching (Tobin & Espinet, 1989). Coaches reported occasionally providing clarification related to the subject matter or guidance on classroom management prior to providing coaching on a specific skill. However, when teachers had a foundation in their content area, coaches felt they could focus on higher-level skills rather than teaching basic concepts.

In order for teachers to benefit from instructional coaching, teachers must be *willing to engage* in the process through practicing coached skills (Lotter et al., 2013) as well as actively implementing coached strategies in their classrooms (e.g., Feighan & Heeren, 2010; Rudd et al., 2009; Stock & Duncan, 2010). Teachers in our study were acutely aware of the role their personal motivation played in the success of the coaching experience. Teachers felt that teacher "buy in" would be a strong mediator of the overall effect of the coaching, since it affects every part of the study, from teacher attitudes to the coaching relationship. Coaches were especially excited to work with teachers who "realized that there was something missing in their instruction" and fully "bought in" to the process. Coaches described the most successful teachers as those who "weren't afraid to fail" and in fact were excited to learn from their miscues. This is not to say that a reluctant teacher would not benefit from coaching, but their gains would not be as significant as those teachers who felt more invested in the process. In fact, teacher resistance to coaching has been connected to lower-quality outcomes (Borman & Feger, 2006). Teachers in the focus groups worried that if there were reluctant teachers participating in the project, they would "bring down the grade" of those who genuinely wanted to improve their teaching. One teacher even suggested that if a teacher was not willing to engage in the coaching process, "it's almost to the point where that data should be thrown out." Coaches noted that teachers not experiencing progress tended to demonstrate stubbornness and unwillingness to change rather than seeing the "big picture" of the benefits of coaching.

Another important teacher characteristic was having a *genuine interest in improving student learning* and believing in their students' abilities to adjust to the new strategies and approaches being coached. One coach noted they "really appreciated it when teachers would try to find the value in what they were doing for them as a teacher but also for the kids in their classroom." Coaches felt that when teachers assumed that the instructional approach was "way too tough for these kids," they were not willing to give full effort toward implementing coached changes.

Requisite Relationship Components

The strengths-based shared approach to a coaching partnership comprises those relational approaches that help to establish a successful coaching relationship. These four components—an emphasis on positive feedback, rapport, mutual respect, and reciprocal trust—form the relational framework which allows both sides to fulfill their potential within the relationship.

Individualized feedback is one of the advantages of coaching over other forms of professional development (Sailors & Price, 2010). However, concerted effort should be given to provide positive rather than corrective feedback (Rock et al., 2009). As one coach pointed out, placing an ***emphasis on positive feedback*** was important because they were able to “make a connection with the person” they might not otherwise. Most of the teachers expected their coaching to be evaluative and to focus mainly on areas for improvement, but their experience was quite different. As noted by one teacher, “I never felt like we were being nitpicked.” Coaches noted that emphasizing positive feedback in their interactions allowed them to connect with their teachers and reframe concerns and perspectives in a “new light.” For example, one teacher described an interaction with her coach when she was being particularly critical of herself: “I thought I sucked. I thought, ‘Oh my God. That was the worst lesson. Look at my kids.’” The coach responded by pointing out several successes in the lesson and only providing suggestions for future lessons in a supportive manner. The end result of this interaction was that the teacher felt more comfortable to try something new. Coaches tried to emphasize their role as helper, rather than evaluator. This emphasis on positive feedback must be present throughout the coaching process, and it serves to enhance the existing relationship components (rapport, mutual respect, reciprocal trust) as coaching progresses.

Although the initial literature review did not explicitly identify rapport as an active ingredient, it was underlying much of the discussions involving relational aspects between coach and teacher. ***Rapport*** can be built through a number of ways, including clearly defining roles within the partnership (Ertmer et al., 2003) or through coach interpersonal skills (e.g., Borman & Feger, 2006). Rapport consists of those relational factors that enable the coach and teacher to interact in a positive, productive manner (i.e., get along). Rapport is built through coaches and teachers connecting with one another in a pleasant manner, taking steps to acknowledge the other’s life outside of the coaching setting, learning “a little bit about what’s going on in their lives,” and listening to personal stories unrelated to the coaching. For this study, the summer institute professional development workshop was a critical component in developing the rapport between coaches and teachers leading into their coaching experience. Teachers commented that the summer institute helped them “build relationships” and “be comfortable” with their coaches. After the workshop, teachers no longer worried about being “thrown to the wolves” by their coach. One teacher explained that her relationship with her coach was her “number one” reason for investing her time and “buying into” what her coach was telling her. Coaches also spoke of the importance of building rapport throughout their interactions with their teachers. One coach found that beginning of each session by conducting an “on-line handshake” with the teacher connected the coach with the teacher and let the teacher know “that you’re interested in them and their world.”

In the context of this coaching—that is, with teachers learning to teach using guided scientific inquiry—the coaches noted that placing teachers in the role of students (i.e., coaching through a guided inquiry approach) was helpful and informative so that coaches were “helping them find answers” rather than telling them the answers. The coaches found themselves providing coaching beyond science inquiry and were often instead providing general support to the teachers. “General support” could encompass a number of topics not immediately apparent as related to science inquiry, such as providing “emotional support” to the teachers or general classroom management, which one coach described as “good practices that they may not have been exposed to.”

When coach and teacher share respect for each other, it provides opportunity for even reluctant and skeptical teachers to benefit from coaching (Sugar, 2005). *Mutual respect* occurs when the coach and teacher both respect the other’s competency and potential to contribute to the coaching process, encouraging an environment of collaboration and reflection (Obara, 2010). Coaches found that establishing mutual respect required a conscious effort to recognize the experience and skills of the teachers. Coaches had to make efforts not only to command the respect of the teachers they worked with, but also to respect the qualifications of those same teachers. For example, one coach “tried to really be conscious of and careful of honoring their experience,” and found that this was a “key component” in strengthening their relationship. Teachers in our study echoed the importance of mutual respect for the coaching experience to be successful. In particular, it was important for our teachers that the coaches had classroom experience, that they had “walked a mile in my shoes.” One teacher described a particular distrust of feedback from someone who had never been inside a classroom. As one teacher noted, “You can take the criticism from them because you respect them, and you appreciate that relationship that you built with them. It comes back to that mutual respect.” Both coach and teacher should share the experience of learning together and should strive to be what Bransfield, Holt, and Nastasi (2007) labeled as “critical friends.”

Finally, the coaching partnership is built on coach and teacher forming an “alliance” in which there is *reciprocal trust* between both parties while they are working together toward a common goal (Denton & Hasbrouck 2009). A lack of clarity regarding the coaches’ role may lead to resistance from teachers, especially among those teachers with considerable experience in the coached subject area (Borman & Feger, 2006). Certain studies (e.g., Ertmer, et al., 2003; Hendrickson et al., 1993) reported that when defining coach and teacher roles, it should be clear the coach is serving a non-evaluative role. That is, they are working to help teachers, not to evaluate and report about them to the administration. Coaches felt this was especially important with newer teachers because they may feel too “intimidated” to bring struggles or concerns to their mentors out of fear that the mentors may interpret those questions to mean they are a “bad teacher.” This contrasted with the coaches, whom the teachers could trust that “there wasn’t any danger that we were going to go and tell someone about either their strengths or weaknesses.” Coaches and teachers both needed to be sure that they were safe to fully invest in growth through the partnership, without worry of shared information or observations being passed on to others outside of the partnership (i.e., trust of confidentiality). Coaches said that teachers “knew we weren’t going to go around and gossip about them” and as a result were comfortable enough to share even personal information. As a result of the reciprocity of trust with the coaches, the

teachers felt supported knowing that “someone was watching to see how it went” instead of feeling like the coaches were “Big Brother.”

Requisite Stages of the Goal-directed Coaching Process

Successful coaching requires the progression through specific stages of the process; as such, the stages of coaching are also considered active ingredients within our framework. The coaching process utilized in the experimental study was adapted from Hanft, Rush, and Shelden’s (2004) stages of coaching framework. The framework’s stages were supported through our analyses; however, an additional stage of the coaching process was added to our proposed theoretical framework to better capture the mechanics of successful coaching. The resulting requisite stages within our model consist of a ***joint planning*** stage where teacher and coach discuss and agree on actions to be conducted before and during the next coaching implementation, and which occurs during all coaching conversations. Next, coach and teacher engage in an ***action/practice*** stage, which consists of opportunities for the teacher to practice, refine, and/or analyze new skills, strategies, or ideas as determined by the joint plan. They then engage in ***observation***, where one party examines the other’s action or practice. The third stage is ***individual reflection***, which involves the analysis of actions and practices, in light of the information obtained. Finally, teacher and coach participate in ***feedback***, where the coach provides information to the teacher following implementation and observation to promote the advancement of practiced skills. As a result of our analyses for this qualitative study, an additional stage was deemed necessary following the feedback stage: ***reflective discussion***. This stage consists of coach and teacher both elaborating on the feedback provided, emphasizing the bidirectional nature of the partnership. This then operates in a loop fashion, with reflective discussion naturally leading to additional joint planning and the determination whether to continue or conclude coaching. To guide this process, our coaches were provided a “coaching protocol” that provided structure as they went through the coaching.

Joint planning: Preparation for future sessions. Joint planning occurs as the coach and teacher work together to prepare and determine goals for upcoming sessions. It is important for the coach and teacher to work together to establish the focus and goals of the coaching relationship, both with regard to the coaching process itself, as well as their desired student outcomes (McGatha, 2008). While joint planning between teachers and their coaches was an explicit step in the coaching protocol, teachers attributed this activity more to the relationship they had with their coaches. Jointly planning goals was the natural outcome of a relationship built with mutual respect and reciprocal trust. By jointly planning their goals, teachers felt “on the same page” with their coaches and were not concerned that there was “some kind of outside agenda going on.” Coaches could provide scaffolding to help teachers learn skills, allowing more autonomy in their determination on what to focus. Regardless, this stage was not a matter of the coach providing directions to the teacher without also including the teachers’ input; coaches felt jointly planning provided flexibility in the planning so it did not “feel like we were trying to dictate their whole curriculum.” This idea aligns with the concept of “collective participation” (Campbell & Malkus, 2011), centered on a community of practice in which the coach serves as a facilitator rather than director toward coaching goals. In this model, coach and teacher jointly identify plans for directions of future sessions and practice (Powell et al., 2010).

Action/Practice. Following the joint planning phase, the teacher should engage in action or practice wherein he or she may develop the target skills. For the initial conceptualization drawn from the literature, this phase was primarily enacted during the two-week summer institute through the coaches' modeling of skills followed by the teachers' practice of those skills and then receiving feedback on their implementation. However, the action/practice stage during our coaching consisted of modeling with teachers practicing followed by guided feedback from coaches. Consistent with the literature, modeling is often decreased as teachers gain more autonomy and begin to implement coached skills directly into their own practice (Collett, 2012). Following qualitative analysis of focus group data, this stage was adapted to include any teacher implementation of plans from the session, be it through structured practice (e.g., practice during the coaching session) or in their own classroom. Coaches noted that it is during this stage where teachers really begin to receive "a little more responsibility back in their hands," which helps them to understand the process better. Coaches further noted that after teachers began applying coached skills in the classroom, they saw those same teachers thinking "Oh, I get it now!"

Observation. During coaching, observation occurs both by the coach and the teacher. Denton and Hasbrouck (2009) noted in their "consensus" definition of coaching that it should include some form of teacher observation, regardless of how varied actual coaching practice appears across different sources. Observation of the teacher was mentioned in the majority of articles (e.g., Driscoll, 2008; Feighan & Heeren, 2010; Nidus & Sadder, 2009; Rose, 2010). Observing the application of coached strategies provides support for coaches' analyses (Roelofs et al., 1991) and enables the coach to provide much more effective feedback and encouragement. Observation of implementation is a crucial ingredient in coaching due to its connection with the other stages. For example, coaches providing feedback or helping select targeted areas on which to focus during coaching are largely dependent on observation to make progress. Observation enables coaches to identify areas of strength or weakness using their own judgment. Observations do not necessarily need to occur in person, and current technology makes remote observation even more accessible (e.g., Allen, Pianta, Gregory, Mikami, & Lun, 2011; Powell et al., 2010).

The larger CSI study used a web-mediated approach to instructional coaching. As part of the protocol for coaching, teachers would video record their target lesson and then share the video with their coach for feedback. Teachers would also watch their own video to prepare for the coaching meeting. The self-observation of teaching proved to be one of the most powerful parts of the coaching process for teachers. Teachers moved through an initial awkward phase of watching themselves, beyond their own self-consciousness, to regard self-observation as a necessary part of the coaching process. During their first self-observation, teachers recalled being very critical of themselves: "Is that what I sound like? Do I really sound crabby?"; "I caught myself saying the same [thing] like 'ok, ok, ok.'"; "I never knew that I talked with my hands as much as I talked with my hands. Ever."; and "Why did I wear those pants?" This stage was short-lived as the teachers quickly "got over it." As noted by one participant, "Did you notice how fast that disappeared? How fast you started evaluating your actual process instead of yourself?" In this stage, teachers commented that they were able to see students' reactions that they had not attended to during the lesson, students that were not "on your radar." Through the self-observation, teachers were able to "go back and find the 'aha moments,' to reinforce that what you are doing is making a difference." This allowed teachers to build on their strengths and

the positive improvements they were making rather than getting “hung up on the one thing that didn’t work.” Ultimately, teachers felt that actively watching their own teaching was an “important piece” of the coaching process. Coaches agreed that observation was key to the coaching process and that the use of video to facilitate observation was a powerful strategy. However, conducting observations efficiently was a concern for one coach, who reported initially struggling to identify the best strategies to observe and “capture information that would be helpful to a teacher” and to limit the scope of observations to what needed addressing first. Another coach found it helpful to “break down” their observations into pieces before addressing the overall session.

Individual Reflection. Following observation but prior to feedback, the coach and teacher should engage in individual reflection of the practice. Both coach and teacher can benefit from self-reflection. In fact, coaches should utilize the same strategies in monitoring their coaching tactics and implementation as they ask teachers to use when reflecting on their teaching (Roelofs et al., 1991). Coaches in our study engaged in self-reflection following each coaching session and found it to be beneficial in improving their coaching practice.

Video recording equipment is a valuable resource for facilitating self-reflection, as it allows for targeting specific time points of the action/practice stage to reflect upon (Allen et al., 2011; Powell et al., 2010). As a result of observing their own teaching, teachers were able to reflect upon what they saw themselves do in the classroom. Teachers described this as “actively watching” themselves. The coaching protocol provided the structure and the accountability to actually “stop and reflect on your teaching,” as well as to consider the implications of their practice. The process of reflection prepared teachers to get the most out of the coaching sessions. Teachers felt they “knew what the coach was talking about” because they had already had a “chance to reflect on it” themselves.

Feedback. While teachers appreciated what they learned about themselves through observing and reflecting on their own teaching, what they truly valued from the coaching process was the feedback they received from their coaches. The timeliness of the feedback, which typically occurred within a few days of the lesson, was important to teachers as it allowed them to make incremental improvements in their teaching in real time, rather than waiting for weeks, or “try and come back next summer and we’ll see how it went.” When coaches can identify specific instances from their observation, coach and teacher are able to focus coaching sessions on individual behaviors (Hendrickson et al., 1993). Our use of technology to support coaching provided an advantage in this area, because coaches and teachers were able to return to specific instances on video during coaching. The feedback itself was not unidirectional, as the coaches also had teachers critique themselves and aid with the feedback. This also allowed coaches to dedicate time to “turning the questioning back” to their teachers, having them identify their own strengths and weaknesses. Often, areas for improvement identified by the teachers aligned with those found by the coaches. Teachers were eager to hear what their coaches had to say. One teacher shared, “I got to the point where I couldn’t wait. Like I was excited for my coaching session because I wanted to get that feedback, and I think if I had to wait for a week to get it, I’d get antsy.” The presence of consistent feedback was appreciated by these rural teachers, who may otherwise be isolated in their practice. One teacher who was the only science teacher in the school pointed out that as “the only teacher that teaches science, it was nice to have somebody be

able to watch me and give me feedback because nobody at my school can, and I wanted to improve.”

Reflective discussion. Once both sides had provided feedback from their observations, they then engaged in reflective discussion. This could consist of evaluating whether impressions aligned with data, or examining implications for certain observed behaviors. This stage served as a “valuable tool” to monitor progress and provide overall impressions. Coaches emphasized that their ability to follow up when there was misalignment between teacher expectations and actual performance was helpful for planning. Through the use of well-crafted questions, coaches are better able to engage teachers during coaching as well as transform their thinking and perspectives (Archon, 2008). The use of intentional questioning strategies can help mediate teachers’ thinking and prompt engagement (McGatha, 2008; Feger et al., 2004). Coach-led reflections allow teachers to focus on areas for improvement and strengths (Powell et al., 2010). Engaging with their coach in a reflective discussion helped the teachers develop their own reflective practices. Through this meta-reflection, teachers began to notice what their coaches would look for in the video-recorded lesson, which in turn changed how they watched themselves. As one teacher commented, “It made me look at the video differently than I probably would, and I needed that.” As the teachers’ reflection skills developed through the guided reflection process, it was not uncommon for the teachers to have noted the same example for discussion as their coach. While complete congruence between coach and teacher in selecting video segments to discuss was not the purpose of the reflective discussion, some overlap did serve to increase the teachers’ confidence in their own reflection skills.

Joint Planning: Decision to end coaching. The coaching process tended to cycle through the above stages until the coach and teacher jointly determined it was time to end the coaching process. The coaches varied in their reasoning regarding the appropriate time to end the coaching, but they all agreed that it should be determined based on the individual teacher’s progress instead of a standardized or number-based guideline. Typical indicators may include teachers showing signs of “losing interest” in coaching where they might have even engaged in reflection but at a more internal level such that coaching sessions were no longer necessary. Coaches described the determination of when to formally end coaching as an “evolving process,” but it generally was related to teachers relaying what coaches described as “that ‘I did it, I’m done’ kind of attitude,” rather than any specific achievement of objectives.

Program Outcomes

The ultimate goal of coaching involves coaches facilitating teachers’ ability, through strategic scaffolding, to identify effective strategies as they abandon non-productive practices in favor of Improved Teacher Practices (Collett, 2012). Coaches thus empower teachers to make decisions regarding those effective strategies and successfully implement them independently, although they initially help those teachers identify what works and what does not (Matsumura et al., 2012). By providing teachers with time to practice new skills, instructional coaching supports mastering those skills (Cantrell & Hughes, 2008; Roelofs et al., 1991). In our study, teachers described developing a more complete and nuanced understanding about teaching scientific inquiry, the focus of this particular coaching project. This Increased Teacher Knowledge was present even for teachers who learned about inquiry in their pre-service

coursework and had previously taught inquiry to their students; those teachers reported they had not yet fully understood what science inquiry “really is.” As a result of their coaching, however, teachers were able to “put it all together” and teach scientific inquiry in a more meaningful way. Instead of responding to students’ questions with an answer, teachers began modeling inquiry for their students in much the same way their coach modeled inquiry for them. They became more comfortable guiding their students through open-ended questioning such as “how did you find that answer for...” or “explain to me why you think that is.” Teacher confidence went from “holy cow, I have no clue what I’m doing” to “I gained the skills and confidence to see how I could take what I had and turn it into something great.” Coaches noticed a number of positive outcomes for their teachers, including improved confidence, better preparation to engage their students, and an understanding of scientific inquiry. They felt that engagement in the coaching process “affirmed that they were a competent teacher,” but also taught them new skills which actually improved their teaching. The coaches noted specific instances where it became clear that the teachers “finally understood” the concept of scientific inquiry and were able to “step back” and let their students participate “at a level you never thought they’d be able to.”

One of the most salient outcomes for the teachers was they felt the newly acquired approach to teaching inquiry would have *Sustainability* beyond the duration of the program. Already they noticed that they were naturally integrating inquiry approaches in their other classes. As one teacher commented, “When I had the choice, I had been choosing the inquiry-based ones [lessons] because it made chemistry fun for me, not just the kids.” Prior to the program, teachers felt integrating inquiry into their teaching was “like running a race with no finish line.” But, with the tools they learned from their coach, they now felt that they could transform their entire curriculum. They also realized that the other teachers who participated in the program had become valuable resources. By sharing their lesson plans with each other, they would not have to “start from scratch” when preparing additional inquiry lessons. Coaches noted these relationships were a “huge” benefit, especially for rural teachers, who frequently constitute the entire science department. Now these teachers are networked with each other and have a mechanism for passing on effective strategies from one teacher to the next (e.g., social media, email lists, in-person meetings). Finally, coaches noted the role that fidelity through the process played in developing mastery and thus sustainability, where it was not a situation where they could just “put my time in,” and instead had to engage with the process to achieve success, which then would carry over after the year was completed.

By increasing teacher knowledge and improving teacher practice, instructional coaching also aims to produce **Improved Student Outcomes**, although it often takes additional years to before these outcomes are fully realized (e.g., Allen et al., 2011; Campbell & Malkus, 2011). While the quantitative results of the *CSI* study did show a modest positive impact on student outcomes (Nugent, Kunz, & Houston, 2015), the findings from our qualitative study indicated substantial impacts on student learning. That is, teachers used clear language that they “knew” their students were positively affected by the process, regardless of the effects our academic measures demonstrated. Teachers described the process of inquiry as “such an important life lesson” that even if the students had a “lousy idea,” they learned that being wrong is acceptable as long as they were learning. Students learned that sometimes eliminating what doesn’t work leads one to the path of what does. One teacher summed up her students’ learning: “By the end of this entire process, I had students that truly understood the scientific method and truly

understood what a hypothesis is and how to analyze data.” The students’ understanding was not limited to the six-week coaching window. Months later, students were still applying the inquiry process, as noted by this teacher: “It was like their brains were able to wrap around the idea.” Learning the inquiry process seemed to level the playing field for the students. Teachers commented that the “good students” who excelled at memorizing the answers and repeating them on a test no longer had an advantage in the classroom. They were in the same boat with the rest of their peers, learning a new way to think and process information. As a result, many of the other students began to develop a sense of confidence in their learning. Teachers commented that it was “refreshing” to see students in this group feel that “I can do science” and to “see that pride in ‘I came up with this really cool idea and I get to implement it.’”

Coaches echoed the teachers’ perspectives regarding the positive student outcomes through the coached science inquiry, noting that the teachers successfully engaged students they previously were unable to reach. Coaches reported teachers who were surprised when students who rarely talked began to speak up and demonstrate strong understanding of the material. One coach even provided an anecdote suggesting the coaching had led to a student shifting to a more mastery-focused mindset:

Well, I know one teacher had a young lady that didn’t do very well in school and didn’t do very well in science and she had screwed up her data collection and the teacher said, “Well, why don’t you just go ahead and use your neighbor’s?” and she said “Wouldn’t I learn it better if I did it myself?” And he’s like, “Yes you would.” “Okay, I’ll redo it then” and she went back and got the equipment and started over.

The coaches in our study also described the impact of the coaching experience on their own professional development. They felt it was a “rewarding experience” to be able to share their own accumulated knowledge, and it changed their perspective on their own teaching. The coaches noted it was a “rare privilege” to see inside another teacher’s classroom, and they made multiple comments wishing they had received the coaching experience earlier in their careers so they could translate more back to their own instructional practice. Coaches appreciated being able to contribute to “a bigger body, more than just myself” and felt coaching was a “huge opportunity for growth.”

One barrier to coaching science inquiry that needed to be accounted for was balancing coaching requirements with state and national standards, as the teachers needed to ensure they were fulfilling administrative expectations in addition to those of the coaches and researchers. They discussed how future research would need to make sure to take into account the differing emphasis districts place on meeting standards (e.g., Next Generation Science Standards, NGSS). Coaches noted they had teachers who were “hyper-focused” on covering all of their standards, rather than ensuring students understood them. This placed extra pressure on the teachers going through their lessons as they worried about the number of standards to cover, rather than being “willing to give it the time to get to grow and get there.”

Discussion

Our study sought to identify the active ingredients of instructional coaching. We used data from the existing coaching literature and coach- and teacher-informed data from the *CSI* study to develop a conceptual model of coaching that is comprised of the active ingredients of coaching. The *CSI* study used a highly structured experimental design that resulted in strong evidence that instructional coaching impacted rural science teacher knowledge, attitudes, and skills in teaching inquiry (Nugent, Kunz, & Houston, 2015). As a result, our participants were ideally positioned to articulate the factors that were responsible for improvements in targeted teacher and student outcomes. Our resulting model indicated the presence of prerequisite characteristics for both coach and teacher, which combines with relational factors throughout the iterative process of engaging in the coaching process, to ultimately lead to those identified outcomes. These outcomes exist as both formative and summative outcomes. That is, they are formative as coach and teacher regularly evaluate progress during joint planning and reflection during the cyclical decision points where they determine whether to continue or terminate coaching. They are then summative once coaching has been terminated whereupon they can be used to evaluate the effectiveness of the coaching process.

This study stands to make multiple contributions to the existing coaching literature. Whereas previous researchers have spent time exploring possible elements that are essential to effective coaching, this paper is the first to organize those essential “ingredients” beyond the coaching stages into a coherent model. Our conceptual model was derived from the systematic analysis of our participants’ experiences and best practices suggested by the literature on instructional coaching, thereby providing a richer understanding of the active ingredients than either data source on its own.

Another novel contribution our study makes to the extant coaching literature is a result of the decision to examine coaching within a rural context. Rural contexts provide unique challenges to conducting effective coaching, such as distance and technological barriers (Reeves, 2003). Rural contexts are often isolated, with up to hundreds of miles separating educators from professional development support. The multiple roles (e.g., teaching multiple subjects, athletic coach, student advisor) often assumed by teachers in rural districts also limit their availability to fully participate in and benefit from traditional, on-site instructional coaching (Lave & Wagner, 1991). As a result, the coaching process must be efficient and delivered in a manner that provides the greatest opportunity for positive outcomes. Because our coaching model takes the unique demands and constraints of the rural context into account, our model has greater potential to generalize to less restrictive settings (e.g., more urban settings where those unique rural challenges will not be present). The importance of some of the identified active ingredients may look different in different geographical settings, such as urban or suburban. For example, within the coaching process, the use of technology was critical to our delivery method of coaching because of the logistics of delivering coaching services across a large geographic area. It was simply not plausible to conduct coaching sessions on-site for the large number of participating teachers (124 participating teachers over the course of the project). Coaches in suburban and urban settings may be able to observe teacher practice in person, and therefore not need to use online meeting software for this purpose. However, it would be significantly more difficult for

teachers to effectively reflect on their own performance without the aid of some type of recording technology. As a result, we believe that technological competence would remain a critical prerequisite characteristic for successful coaches, regardless of context.

The literature provided considerable support for the importance of a strong coach-teacher relationship through the number of sources naming it as a key ingredient. In addition, the focus group data provided strong validating evidence for the importance of strong rapport, with coaches and teachers both emphasizing relational components of their experiences. Future work might operationalize and quantify the identified relational factors (rapport, mutual respect, reciprocal trust, emphasis on positive feedback) and statistically test their contributions to the outcomes.

Another unique finding from the grounded theory approach was the discovery that coaching is not something that will occur on its own. With all of the expectations that fall upon teachers, most teachers simply will not make time on their own to seek and receive coaching, especially if the financial responsibility for seeking such help falls on the teachers. It is important for districts to provide opportunities for this type of professional development, especially when embedded within additional training opportunities. From an organizational perspective, if coaches are not made available by the district, the teachers are certainly going to have less opportunity to seek out coaching. Focus groups conducted with coaches revealed as much, with coaches recognizing that teachers' loads are already stressed, and without administrative support they often feel "on their own" for their own professional development. However, with coach support being available, teachers are provided someone to motivate them to try new strategies and "keep them moving." As well, given the organizational improvement efforts outlined and funded through NCLB, it behooves districts to seek out professional development that can be embedded into individualized plans for teachers' accountability. Focus group data from the teachers suggested that teacher "buy in" would be a strong mediator of the overall effect of the coaching, since it affects every part of the study, from student attitudes to the coaching relationship. This is a direct extension of Bandura's (1977) work on the expectancy-beliefs relationship, and further exemplifies the need to not only make coaching accessible to teachers, but also to explore methods of improving motivation to engage with the coaching process.

All coaches and teachers progressed through the same identified stages of the coaching process; therefore, there was no variance in our stages. Anecdotally, we observed differential outcomes among coach and teacher dyads whose quality within the stages varied. That is, those dyads who best achieved the goals of the stages throughout the coaching process were anecdotally experiencing the most success, a claim also supported by coach reports. Future research should further investigate observable differences in the quality of the coaching sessions and should also seek to explore the validation of each stage of the coaching process. While the value of feedback from an instructional coach may be universal across different settings, for the rural science teachers in this study, the feedback served a critical role. Rural science teachers, unlike teachers of other subjects in rural areas, or science teachers in suburban or urban areas, are frequently the only one at their school familiar with and responsible for teaching their subject matter.

Because this is the first time all the ingredients of successful coaching have been synthesized into a single model, much work remains. While we used many grounded theory methods to develop our model, the constraints of being embedded in an experimental study limited the full use of these methods. Therefore, we recommend that further studies be conducted to empirically validate our framework. Future studies will be able to provide validation through experimental “unpacking” of identified ingredients and statistically exploring their roles in the model. When future researchers seek to test these relationships, the quantitative model will likely look somewhat different from what we have presented, and adaptations may be necessary to transform ingredients into a measureable structural model. In addition to validating this conceptual model, another logical step in future studies would be to explore if or how the model differs across contexts. Future studies should explore the model not only in more densely populated settings, but also across different subject areas, delivery mechanism of coaching (e.g., in-person versus via distance technology) and different student age groups (e.g., elementary). Taking those next logical steps of model validation as well as implementation variations represent two critical and timely research agendas. Together, such research studies will yield an empirically supported model of instructional coaching and appropriate variations across geographic contexts, subject areas and grade levels.

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